

REMARKS

Claims 1-22 were pending in this application prior to the Office Action. Claim 22 is amended herein, and claims 1-14 and 21 are canceled. Thus, claims 15-20 and 22 are pending in this application. In view of the above amendments and the following remarks, reconsideration and allowance of the application is respectfully requested.

The Office has objected to the Title as being non-descriptive. However, as the new Title presented herein is descriptive, Applicants respectfully request that this objection be reconsidered and withdrawn.

Claims 1-6, 8-14 and 21-22 stand rejected under 35 U.S.C. § 102(b) as being anticipated by the Japanese document 09-161845 (JP'845). In addition, claim 1 stands rejected (at least) under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application Publication No. 2005/0026041 to Jouanneau et al. Moreover, claims 1-3 stand rejected (at least) under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application Publication No. 2003/0054258 to Ito et al.

However, in view of the cancellation of claims 1-14 and 21 herein, and the amendment of claim 22 to be dependent on claim 15, which was not rejected under 35 U.S.C. § 102 above, Applicants respectfully submit that this rejection is moot, and should be withdrawn.

Claims 15-20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over JP'845 in view of U.S. Patent No. 4,475,994 to Gagne et al. In particular, the Examiner asserts that JP'845 discloses a non-aqueous electrolyte secondary battery comprising a non-aqueous electrolyte solution (TITLE) including organic solvents and a lithium compound dissolved (the electrolyte) therein (ABSTRACT). In addition, the Examiner asserts that JP'845 discloses the use of dinitrile compounds in the electrolytic solution (SECTION 0015) including at least succinonitrile and glutaronitrile (SECTION 0025-0026). Furthermore, the Examiner asserts that EXAMPLE 6 of JP'845 exemplifies the use of glutaronitrile in electrolytic solutions, and that JP'845 clearly discloses that all of the solvents can be used alone or in combination, that is, mixture thereof (SECTION 0026, 0015, 0002). Thus, the Examiner asserts that JP'845 at once envisage the combined use of the aforementioned

electrolyte solvents. Finally, the Examiner asserts that EXAMPLES 5-6 of JP'845 exemplify the use of nitrile compounds including propionitrile in an amount of 17.8 vol %; and glutaronitrile in an amount of 19 vol % of the electrolytic solutions (EXAMPLES 5-6).

The Examiner further correctly states that JP'845 fails to disclose or suggest the specific nitrile amounts recited in the claims. Therefore, the Examiner asserts that Gagne discloses an electrochemical cell (ABSTRACT) comprising an aprotic solvent containing a dissolved salt (COL 3, lines 61-64) wherein nitriles such as succinonitrile, adiponitrile among others are added to the electrolyte in an amount of at least about 1 % by weight of thereof to the total weight of the electrolyte solution to stabilize the electrolyte. Thus, the Examiner asserts that it would have been obvious to one skilled in the art at the time the invention was made to use the specific nitrile amount of Gagne in the battery of JP'845 because Gagne teaches that nitriles are added to the electrolyte in the claimed amount to stabilize the electrolyte.

However, neither JP'845 nor Gagne, alone or in combination disclose, suggest, or render obvious each and every feature in the claims. In particular, neither Gagne nor JP'845, alone or in combination, discloses or suggests a non-aqueous electrolytic solution comprising a non-aqueous solvent and an electrolyte, which further contains a dinitrile compound in an amount of 0.001 to 10 wt. %, as is recited in claim 15.

As the Examiner asserts, JP'845 generally discloses a non-aqueous electrolyte secondary battery comprising a non-aqueous electrolyte solution including organic solvents and a lithium compound dissolved (the electrolyte) therein. However, Applicants respectfully disagree with the Examiner's assertion that JP'845 discloses the use of dinitrile compounds in the electrolytic solution (SECTION 0015) including at least succinonitrile and glutaronitrile (SECTION 0025-0026). In particular, SECTION 0015 of JP'845 describes the use of nitriles as solvents but fails to disclose or suggest the use of dinitriles. In addition, SECTION 0015 is silent with respect to contents of nitriles or other solvents, and fails to disclose any generic description for a range of a content of the solvents. In addition, EXAMPLE 6 of JP'845 describes the use of glutaronitrile (dinitrile compound) as the solvent, but *not as an additive*. As is indicated by the examiner, EXAMPLE 6 describes the use of glutaronitrile in an amount of 19 vol. % of the electrolytic solution, which is

substantially above the acceptable range of 0.001 to 10 wt. % recited in claim 15.

Applicants would like to direct the Examiner's attention to the working examples set forth in the specification emphasizing the benefits of the claimed range. For example, Table 1 (page 14, lines 19 – 38) indicates that the electrolytic solutions of Examples A-1 to A-7 containing dinitrile compounds (such as adiponitrile and glutaronitrile) in amounts within the claimed range of 0.001 to 10 wt. % show excellent discharge capacity retentions of 85.6% or more. In contrast, the electrolytic solutions of Comparison Examples A-2 and A-3 containing the dinitrile compounds in amounts larger (13 wt. % and 19 wt. %, respectively) than the upper level of the claimed range of 0.001 to 10 wt. % show discharge capacity retentions of 72.3% or less. The use of 19 wt. % glutaronitrile in the electrolytic solution (Comparison Example A-3) shows extremely poor discharge capacity retention such as 64.7%.

Thus, Applicants submit that the results set forth in Table 1 clearly establish that the dinitrile compound should be incorporated into an electrolytic solution in a small amount if an improvement of discharge capacity retention is desired and that the use of the dinitrile compound into an electrolytic solution in a larger amount gives an adverse effect to the solution so far as the discharge capacity retention is concerned. Therefore, while JP'845 suggests the use of a dinitrile compound (i.e. glutaronitrile) in a relatively large amount as a solvent, the resulting discharge capacity retention achieved would be far inferior to using a non-aqueous electrolytic solution comprising a non-aqueous solvent and an electrolyte, which further contains a dinitrile compound in an amount of 0.001 to 10 wt. %, as is recited in claim 15.


In addition, contrary to the Examiner's assertions, Gagne fails to overcome the deficiency of JP'845 described above. As the Examiner asserts, Gagne generally discloses an electrochemical cell comprising an aprotic solvent containing a dissolved salt. Gagne further discloses that nitrile compounds can be incorporated into the salt solution (Col. 6, lines 29-43). However, all of the listed nitrile compounds are *mononitrile* compounds, with the single exception of adiponitrile, which is a dinitrile compound. Gagne also discloses that the amount of the nitrile compound should be *at least* about 1 wt. %, and does not suggest any upper limit.

However, Gagne fails to disclose or suggest that the use of a dinitrile compound is preferable to the use of a mononitrile compound to improve discharge capacity retention. The use of a mononitrile alone (that is, not in combination with an S=O group-containing compound) in the non-aqueous electrolytic solution does not increase the discharge capacity retention. The Examiner attention is again respectfully directed to the experimental results set forth in Table 1 of the specification. In Table 1, the use of propionitrile, which is a mononitrile in an amount of 0.2% (Comparison Example A-4) fails to increase the discharge capacity retention, despite the fact that the amount of propionitrile added falls within the claimed range 0.001 wt. % and 10 wt. %. Moreover, Gagne fails to suggest an upper range of the amount of nitrile compounds in the salt solution. Instead, Gagne discloses that nitriles should be added in an amount of at least 1 wt. % nitrile to the total weight of the solution.

Accordingly, as neither JP'845 nor Gagne, alone or in combination, discloses, suggests, or renders obvious each and every feature in the claims, Applicants respectfully request that the rejection of claim 15 under 35 U.S.C. § 103(a) be reconsidered and withdrawn. In addition, claims 15-20 and 22 are also allowable by virtue of their dependency on claim 15, and also on their own merits.

In view of the arguments set forth above, Applicants respectfully request reconsideration and withdrawal of above rejections, and that the application be immediately passed to issue. If a conference would expedite prosecution of the instant application, the Examiner is hereby invited to telephone the undersigned to arrange such a conference.

Respectfully submitted,


Jeffrey L. Costellia
Registration No. 35,483

JLC/SMH

NIXON PEABODY LLP
Suite 900, 401 9th Street, N.W.
Washington, D.C. 20004-2128
(202) 585-8000